TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Form PCT/IPEA/416
B03/0533PC		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP2004/012468	04.11.2004	04.11.2003
International Patent Classification (IPC) or national classification and IPC		
C08G71/02, C08G83/00		
Applicant		
BASF AKTIENGESELLSCHAFT		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☐ *(sent to the applicant and to the International Bureau)* a total of _____ sheets, as follows:

      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

      _____ , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/012468

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rule 12.3 and 23.1(b))

☐ publication of the international application (Rule 12.4)

☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-16 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

nos. 1-10 as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* _____ received by this Authority on _____

nos.* _____ received by this Authority on _____

☐ the drawings:

sheets _____ as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/012468

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-8	YES
	Claims	9-10	NO
Inventive step (IS)	Claims	1-8	YES
	Claims	9-10	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

D1: US 2002/161113 A1 (DVORNIC PETAR R ET AL) 31 October 2002 (2002-10-31)

D2: A. V. AMBADE, A. KUMAR: "An Efficient Route for the Synthesis of Hyperbranched Polymers and Dendritic Building Blocks Based on Urea Linkages" JOURNAL OF POLYMER SCIENCE, PART A, POLYMER CHEMISTRY, Vol. 39, 2001, pages 1295-1304, XP002320167

D3: US-A-4 596 866 JACKSON JR. ET AL) 24 June 1986 (1986-06-24)

The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claims 9 and 10 is not novel (PCT Article 33(2)).

D1 discloses a highly branched polyurea comprising polyfunctional monomers, wherein one of the monomers has a functionality of at least three (claim 1). Example 1 relates to a reaction product from tris(2-aminoethyl)amine and IPDI. In principle, the polyureas from D1 relate to polyureas obtained from amines and isocyanates (see, e.g., the first three lines of

paragraph [0014]).

The polyurea in D1 contains the isocyanate base body in the end product ($H_2N-R^1-NH-(C=O)-NH-R^2-NH-(C=O)-NH-R^1-NH_2$), whereas the amines in the polyurea as per the present claim 9 are linked to one another directly via urea groups ($H_2N-R^1-NH-(C=O)-NH-R^1-NH_2$). However, the use of a plurality of different amines, as explicitly envisaged in the present claims, would lead to an identical structure - to obtain the reaction product of the example 1 of D1 (R^2 = 3-methylene-3,5,5-trimethyl-1-cyclohexylene), isophorondiamine would have to be used alongside tris(2-aminoethyl)amine. In theory, isocyanate groups could be present in the end product of D1. However, attention is drawn to the fact that isocyanate groups have the property of reacting with moisture under CO_2 cleavage to form amino groups. In D1 too, it is stated that the end groups are preferably amino groups (claim 19).

It is therefore assumed that the polyureas disclosed in D1 do not have any isocyanate end groups. The subject matter of claim 9 therefore includes polyureas such as can be obtained from the teaching of D1. Moreover, a product is not novel simply because it is produced by a novel method.

D1 is therefore prejudicial to the novelty of claims 9 and 10.

The same applies to D2, which discloses a highly branched polyurea that can be obtained from 3,5-diaminebenzoic

acid via protective group technology (scheme 1 on page 1299). The azide group shown in the scheme reacts with the amino groups to form a urea group, there being at the same time a rearrangement (for further details of the mechanism of the formation of the urea groups, see scheme 2 on page 1300). In the abstract, this rearrangement step is characterised as "in situ generation of isocyanate groups". It can be assumed that the isocyanate groups generated in situ, if any remain in the end product as end groups, would also react with the moisture in the air to form amino groups. In D2, scheme 1 (page 1299), a "hyperbranched polyurea with amino chain ends" is indicated.

The applicant states further that the polyureas described in D2 are difficultly soluble. However, the application does not contain any examples which show a higher solubility of the polyureas as per the invention (and therefore a differentiating feature with respect to D2).

Claims 9 and 10 are therefore not novel either over D2.

D1 is considered the prior art closest to the subject matter of claim 1.

The subject matter of claim 1 differs from D1 in that the highly branched polyurea is produced by a reaction of carbonates with amines and is therefore novel (PCT Article 33(2)).

The applicant states that the highly branched polyureas as per the invention can be produced by a method that is

simple to carry out. The problem solved by the present invention can therefore be seen as providing a simple method for the production of highly branched polyureas.

D3 describes a method for producing polyurea amides from diamine, diacid and diaryl carbonate (column 1, lines 64-68 and example 1). Since none of the monomers used has a valency of greater than two, linear polymers are produced in D3. D3 does not contain any suggestion as to the possibility of using higher valency monomers or in general as to bringing about about branchings. Moreover, D3 is not concerned with pure polyureas. A person skilled in the art would therefore not derive from D3 the idea of replacing the method D1 with the method of D3, so as to solve the problem.

Claim 1 therefore involves an inventive step (PCT Article 33(3)).

Claims 2-8 are dependent on claim 1 and therefore likewise meet the PCT novelty and inventive step requirements.